Silicosis: Pathogenesis, Presentation & Prevention

Presentation by Maddison Church

What is silicosis

- Pneumoconiosis disease → inhalation of dust containing respirable crystalline silica (SiO₂)
- Incorrect use of PPE = exposure in occupational settings

3 major types:

 <u>Chronic:</u> after decades (10 - 30 yrs) of long term low to moderate exposure No early obvious signs, chronic inflammation & progressive fibrosis symptoms of exertional dyspnea, fatigue and chronic coughing

 <u>Acute:</u> within months - years (<1-5 yrs) after frequent exposure to very high levels Vast inflammation, pulmonary oedema & alveolar hemorrhage rapid onset of symptoms; severe dyspnea, cough and weight loss

1) Accelerated: occurs within a decade of high exposure

Fibrosis & symptoms a similar to chronic, yet occurs earlier & progresses rapidly









CLINICAL PRESENTATION

Diagnosis

Patient history of exposure and/ or symptoms \rightarrow Present to physician Physical examination \rightarrow discussion of exposure, lung sounds, referral for radiographic & pulmonary function testing .

Medical Imaging of a case of Chronic Silicosis







Full Lung Function Testing

- Multiple studies investigated the airflow abnormally associated with silicosis
- alveolar damage + fibrosis of lung tissue = mixed ventilatory defect ightarrow displaying obstructive & restrictive patterns (restrictive in later stages as fib

Characterised by:

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- Reduced FEV1, VC, FEV1/FVC ratio, no significant reversibility with bronchodilator
- Reduced TLC (fibrotic element stiffening the lungs) Elevated RV (Gas trapping)
- Impairment in gas transfer (destroyed alveolar membranes)



COMPLEX LUNG FUNCTION (1/02/2018)

		Producted	PredLL	Pref UL	Pre	-NPted	Pest	tatal.	PushCie
visurement date					81.82.58		81.82.98		
VI	1	4.45	2.57	5.25	1.35	30.0	1.30	30.7	83
C	1	5.40	4.25	6.52	3.65	\$7.8	3.50	004	-13
VIBRIC		811.77	73.40	00.85	32.12	-6.4	20.72	46.1	14
7	LA	12.44	1.27	13.00	2.89	325	3.56	22.5	11.1
F 58	U	5.38	322	7.96	6.00	82	0.29	53	419
EF 7505	LA	4.47	2.51	6.54	0.44	11	0.32	6.3	-14.9
	50				2.54		4.00		140
50	Us				3.52		248		42
ung Volum	es								
c	L	7.09	5.48	870	7.30	183.8			
Qièth	- L	3.52	206	430	5-60	154.3			
	L	1.77	1.01	2.53	3.73	210.5			
NTLC		2408	96.87	3367	\$1.10	285.4			
	L	548	425	6.52	252	6.1			
ransfer Fa	ctor								
00 98		4123	32.69	-805	1278	21.2			
0.58		5.09	4.0	729	250	94			
		7.00	5.40	0.75	610	22.2			



7.09 5.40 8.70 5.12 72.2 5.40 4.25 6.52 3.20 51.5 Flow volume loc Reduced → FEV1, FEV1/FVC ratio (very severe obstructive pattern)

Lung Volumes: Elevated \Rightarrow RV Reduced \Rightarrow TLC, VC, (mixed element; TLC not > ULN despite gas trapping)

Transfer factor: Reduced → DLCO (severe impairment)

COMPLEX LUNG FUNCTION (5/09/2018)



TREATMENT & PROGNOSIS

- Incurable (besides Lung transplant), progressive interstitial lung disease
- Most treatment is aimed to slow the progression of the disease
- Lifestyle choices \rightarrow no smoking, limit exposure to carcinogens/leave job
- Pulmonary Rehabilitation Programme to improve patient quality of life
- Respiratory medications regime (corticosteroids, LAMA, LABA & SABA) \rightarrow ensure best possible airflow & limit inflammation
- Supplemental Oxygen therapy \rightarrow ensure best possible oxygen saturations limiting hypoxia

Case example \rightarrow progressed rapidly = poor prognosis \rightarrow life expectancy < 5 yrs Unfortunately patient was unable to achieve a lung transplant and passed early 2019

PREVENTION



Thanks for listening!